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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/600,203

06/20/2003

Grant M. Kloster

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07/13/2006

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EXAMINER

NGUYEN, KHIEM D

ART UNIT

PAPER NUMBER

2823

DATE MAILED: 07/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/600,203	<b>Applicant(s)</b> KLOSTER ET AL.	
	<b>Examiner</b> Khiem D. Nguyen	<b>Art Unit</b> 2823	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 27 April 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-14,16,26,27 and 29-41 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 10-14,16 and 30-38 is/are allowed.
- 6) ☒ Claim(s) 1-8,26,27 and 39-41 is/are rejected.
- 7) ☒ Claim(s) 9 and 29 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>04/27/06</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Response to Amendment*

1. The non-final rejection as set forth in paper No. (011906) mailed on January 23<sup>rd</sup>, 2006 is withdrawn in response to Applicants' amendments. A new rejection is made as set forth in this Office Action. Claims (1-14, 16, 26, 27, and 29-41) are pending in the application.

### *Information Disclosure Statement*

2. The Information Disclosure Statement filed on April 27<sup>th</sup>, 2006 has been considered.

### *Claim Rejections - 35 USC § 102*

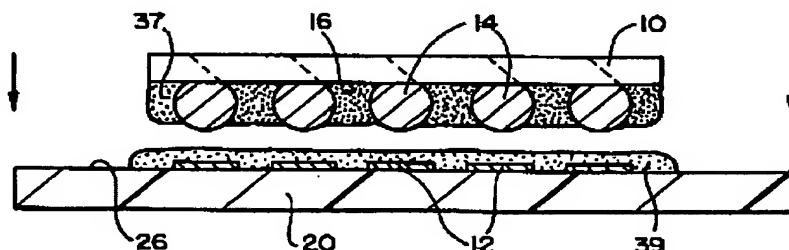
3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

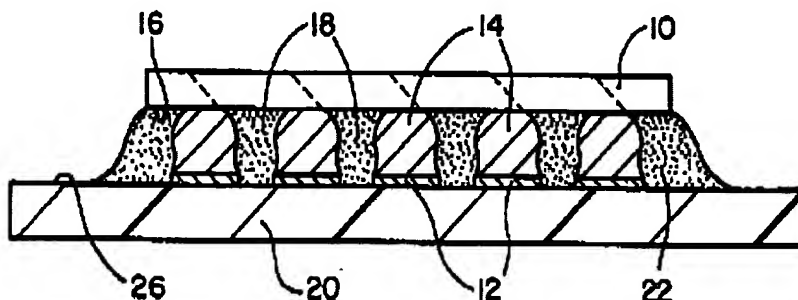
4. Claims 1-8, 26-27, and 39-41 are rejected under 35 U.S.C. 102(b) as being anticipated by Capote et al. (U.S. Patent 6,121,689).

In re claim 1, Capote discloses a method, comprising: forming a layer of first material 39 between two substrates 10, 20 of a stacked device (FIGS. 10); and



**FIG\_10**

forming a layer of second material 37 between the two substrates 20, 10 of the stacked device, wherein the second material 37 causes a reaction in a portion of the first material 39 (col. 9, lines 5-39 and FIGS. 10 and 11).



**FIG. 11**

In re claim 2, as applied to claim 1 above, Capote, discloses all claimed limitations including the limitation wherein the reaction comprises polymerization (col. 12, lines 10-33).

In re claim 3, as applied to claim 1 above, Capote, discloses all claimed limitations including the limitation wherein forming the layer of first material 39 comprises diffusing the first material 39 between a portion of the two substrate 10, 20 of the stacked device (col. 9, lines 19-39).

In re claim 4, as applied to claim 3 above, Capote, discloses all claimed limitations including the limitation wherein the first material 39 is selected from the group consisting of: diisocyanate monomers, a diisocyanate end-capped compliant oligomer, and p-toluenesulfonyl semicarbazide (col. 16, lines 52-66).

In re claim 5, as applied to claim 1 above, Capote, discloses all claimed limitations including the limitation wherein forming the layer of first material 39

comprises one or more of: injecting the first material 39 between a portion of the two substrates 10, 20 of the stacked device, spraying the first material 39 between the portion of the two substrates 10, 20 of the stacked device, and immersing the two substrates 10, 20 of the stacked device in the first material 39 (col. 8, lines 52-66).

In re claim 6, as applied to claim 1 above, Capote, discloses all claimed limitations including the limitation wherein forming the layer of second material 37 comprises diffusing the second material 37 between a portion of the two substrates 10, 20 of the stacked device (col. 9, lines 5-39 and FIG. 10).

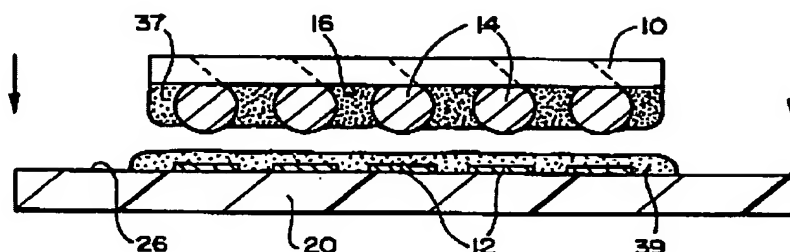
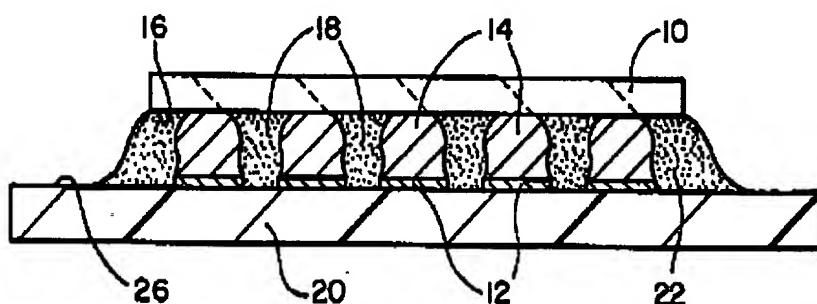
In re claim 7, as applied to claim 3 above, Capote, discloses all claimed limitations including the limitation wherein the second material 37 is selected from the group consisting of: water, a hydroxyl end-capped oligomer, and a carboxylic acid end-capped polymer (col. 15, lines 4-15).

In re claim 8, as applied to claim 1 above, Capote, discloses all claimed limitations including the limitation wherein forming the layer of second material 37 comprises one or more of: injecting the second material 37 between a portion of the two substrates 10, 20 of the stacked device, spraying the second material 37 between the portion of the two substrates 10, 20 of the stacked device, or immersing the two substrates 10, 20 of the stacked device in the second material 37 (col. 8, lines 52-66).

In re claim 26, Capote discloses a method, comprising: forming a layer 39 of material between two substrates 10, 20 of a stacked device; and reacting a portion of the layer of material 22, wherein the reaction (polymerization) inherently results in the

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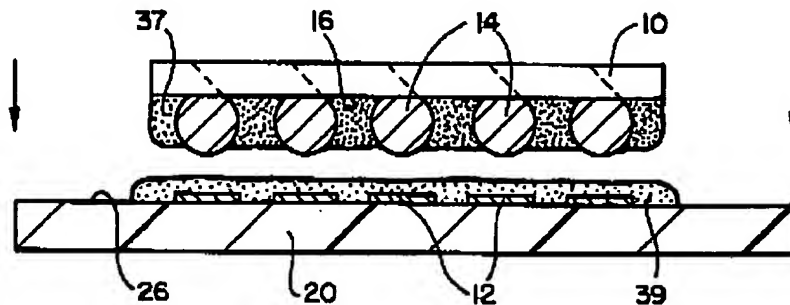
portion of the layer of material increasing in volume (col. 9, lines 5-39 and FIGS. 10 and 11).

**FIG\_10****FIG\_11**

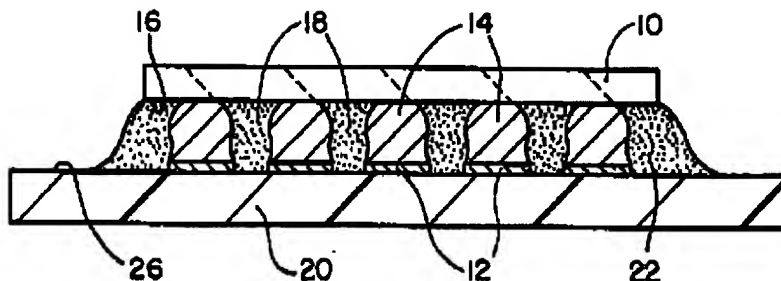
In re claim 27, as applied to claim 26 above, Capote, discloses all claimed limitations including the limitation wherein the reaction comprises polymerization (col. 12, lines 10-33).

In re claim 39, Capate discloses a method of forming stacked wafers comprising: providing a first wafer 20 having a first conductive interconnect 12; providing a second wafer 10 having a second conductive interconnect structure 14; bonding the first conductive interconnect structure 12 to the second conductive interconnect structure 14; and providing a foam filling an area between the first and second wafers adjacent to the

first and second conductive interconnect structures (col. 9, lines 5-39 and FIGS. 10 and 11).



**FIG. 10**



**FIG. 11**

In re claim 40, as applied to claim 39 above, Capote, discloses all claimed limitations including the limitation wherein the method of claim 39, further comprising: thinning at least one of the first 10 and second 20 wafers, the foam providing structure support to the stacked wafers during the thinning (FIGS. 10 and 11).

In re claim 41, as applied to claim 39 above, Capote, discloses all claimed limitations including the limitation wherein the method of claim 39, further comprising: protecting the first 12 and second 14 interconnect structures from oxidation using the foam during a subsequent wafer process (FIGS. 10-11).

***Allowable Subject Matter***

5. Claims 10-14, 16 and 30-38 are allowed over prior of record.
6. Claims 9 and 29 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Reasons for Allowance***

7. After further search and consideration of Applicants' response filed April 27<sup>th</sup>, 2006 (see Applicants' response in Pages 12 and 14 of the April 27<sup>th</sup> response), it is determined that the prior art of record neither anticipates nor renders obvious the claimed subject matter of the instant application as a whole either taken alone or in combination, in particular, prior art of record does not teach or suggest "causing a reaction in a portion of the layer of material where a portion of an area between the two substrate is filled with a polymer foam as a product of the reaction," as recited in independent claims 10, 30, and 35.

Claims 11-14, 16, 31-34, and 36-38 also allowed as being directly or indirectly dependent of the allowed independent base claims.

***Conclusion***

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khiem D. Nguyen whose telephone number is (571) 272-1865. The examiner can normally be reached on Monday-Friday (8:30 AM - 5:30 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew S. Smith can be reached on (571) 272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

K.N.

January 19, 2006

*Brook Kebede*  
BROOK KEBEDE  
PRIMARY EXAMINER